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10/021,719	12/19/2001	Koichiro Tanaka	0756-2409	4721

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EXAMINER

LE, DUNG ANH

ART UNIT

PAPER NUMBER

2818

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Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/021,719

Applicant(s)

TANAKA, KOICHIRO

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-21 and 39-56 is/are allowed.
- 6) ☒ Claim(s) 1-6, 22-28, 30-35, 37, 38 and 57-66 is/are rejected.
- 7) ☒ Claim(s) 7, 29, 36 and 64 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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## DETAILED ACTION

### **Priority**

Acknowledge is made of applicants' claim for foreign priority base on an application 2000-399462 filed in Japan on 12/27/2000.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

### ***Oath/Declaration***

The oath/declaration filed on 12/19/2001 is acceptable.

### ***Specification***

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

**Claim Rejections**

**Set of claims 1-7**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1- 4 are rejected under 35 USC 102 (e) as being anticipated by Kawasaki et al. (6844249 B2).**

Kawasaki et al. teaches a laser annealing method comprising:  
irradiating a surface of an irradiation target 1002/1003 formed over a substrate 1001 with a laser beam, wherein the laser beam is directed obliquely to a major plane of the substrate 1001, and wherein a part of the laser beam transmits through the irradiation target. (fig. 1, col 4, lines 30-60 and refer to col 10, lines 38-45 and lines 50-55).

**Regarding claim 2**, wherein the laser beam becomes uniform in energy distribution at or near an irradiation plane (col 4, lines 19- 21).

**Regarding claim 3**, wherein the laser beam becomes linear in shape at or near an irradiation plane. (fig. 1)

**Regarding claim 4**, wherein the laser beam becomes uniform in energy distribution (col 4, lines 19- 21) and linear in shape at or near an irradiation plane (fig. 1).

#### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 5 and 6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kawasaki et al. (6844249 B2) in view of the following remark.**

Kawasaki et al. disclose the laser beam has a wavelength of 320 nm (col 4, lines 60) but fails to teach the laser beam has a wavelength of 350 nm or more.

However, given the cumulative teaching of Kawasaki et al. It would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or

optimal ranges for laser beam has a wavelength of 350 nm and 400 nm or more through routine experimentation and optimization to obtain optimal device performance.

**Set of claims 22- 29**

**Claims 22-26 are rejected under 35 USC 102 (e) as being anticipated by Kawasaki et al. (6844249 B2).**

Kawasaki et al. teach a laser annealing method comprising:  
irradiating a surface of an irradiation target 1002/1003 formed over a substrate 1001 with a laser beam in order to prevent an interfere with a reflected laser beam, wherein the laser beam is directed obliquely to a major plane of the substrate, and wherein a part of the laser beam transmits through the semiconductor film (fig. 1, col 4, lines 30-60 and refer to col 10, lines 38-45 and lines 50-55).

**Regarding claim 23**, wherein the laser beam irradiated onto the surface of the semiconductor film is not overlapped with the laser beam reflected by the back surface of the substrate.(fig. 1)

**Regarding claim 24**, wherein the laser beam becomes uniform in energy distribution at or near an irradiation plane (col 4, lines 19- 21).

**Regarding claim 25**, wherein the laser beam becomes linear in shape at or near an irradiation plane (fig. 1).

**Regarding claim 26**, wherein the laser beam becomes uniform in energy distribution (col 4, lines 19- 21) and linear in shape at or near an irradiation plane (fig. 1).

**Claims 29 and 30 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kawasaki et al. (6844249 B2) in view of the following remark.**

Kawasaki et al. disclose the laser beam has a wavelength of 320 nm (col 4, lines 60) but fails to teach the laser beam has a wavelength of 350 nm or more.

However, given the cumulative teaching of Kawasaki et al. It would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal ranges for laser beam has a wavelength of 350 nm and 400 nm or more through routine experimentation and optimization to obtain optimal device performance.

**Set of claims 30-38**

**Claims 30-33 and 37 are rejected under 35 USC 102 (e) as being anticipated by Kawasaki et al. (6844249 B2).**

Kawasaki et al. teach a method for fabricating a semiconductor device comprising: forming a semiconductor film 1002/1003 over a substrate; and irradiating a surface of the semiconductor film with a laser beam (1005) , wherein the laser beam is directed obliquely to a major plane of the substrate, and wherein a part of the laser beam transmits through the semiconductor film (fig. 1, col 4, lines 30-60 and refer to col 10, lines 38-45 and lines 50-55).

**Regarding claim 31**, this claim is rejected under the same rationale set forth above to claim 2.

**Regarding claim 32**, this claim is rejected under the same rationale set forth above to claim 3.

**Regarding claim 33**, this claim is rejected under the same rationale set forth above to claim 4.

**Regarding claim 37**, wherein the semiconductor film 1002/1003 comprises silicon.

**Claims 34- 35 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kawasaki et al. (6844249 B2) in view of the following remark.**

**Regarding claims 34- 35** , this claim is rejected under the same rationale set forth above to claim 5- 6.

**Set of claims 57- 66**

**Claims 57-61 and 65 are rejected under 35 USC 102 (e) as being anticipated by Kawasaki et al. (6844249 B2).**

Kawasaki et al. teach method for fabricating a semiconductor device comprising: forming a semiconductor film 1002/1003 over a substrate1001; and irradiating a surface of the semiconductor film with a laser beam in order to prevent an interfere with a reflected laser beam (fig. 1), wherein the laser beam is directed obliquely to a major plane of the substrate, and



wherein a part of the laser beam transmits through the semiconductor film (fig. 1, col 4, lines 30-60 and refer to col 10, lines 38-45 and lines 50-55).

**Regarding claim 58**, this claim is rejected under the same rationale set forth above to claim 23.

**Regarding claim 59**, this claim is rejected under the same rationale set forth above to claim 23.

**Regarding claim 60**, this claim is rejected under the same rationale set forth above to claim 3.

**Regarding claim 61**, this claim is rejected under the same rationale set forth above to claim 4.

**Regarding claim 65**, this claim is rejected under the same rationale set forth above to claim 37.

**Claims 62- 63 and 66 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kawasaki et al. (6844249 B2) in view of the following remark.**

**Regarding claims 62- 63**, this claim is rejected under the same rationale set forth above to claim 5- 6.

**Regarding claim 66**, Kawasaki et al. teaches the claimed invention as applied to claim 57, except for the semiconductor device is incorporated into electronic equipment selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type

display, a player, a digital camera, a front type projector, a rear type projector, a mobile telephone, a mobile book, and a display.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form semiconductor device is incorporated into electronic equipment selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player, a digital camera, a front type projector, a rear type projector, a mobile telephone, a mobile book, and a display, because semiconductor device is commonly used to produce the above limitations, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the special purposes.

#### **Reasons for Indication of Allowable Subject Matter**

**Claims 7, 29, 36 and 64** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Kawasaki et al. (6844249 B2) and Background of Invention, taken individually or combination, do not teach the claimed invention having wherein the laser beam is the second harmonic of one kind selected from the group consisting of a YAG laser, a YVO<sub>4</sub> laser, a YLF laser, a YAlO<sub>3</sub> laser, a ruby laser, an alexandrite layer, a Ti:sapphire layer, and a glass laser.

**Set of Claims 8-14, 15-21, 39- 47 and 48-56 would be allowed.**

The following is a statement of reason for the indication of allowable subject matter:

Claims 8- 14, 15- 21, 39- 47 and 48- 56 are considered allowable since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Kawasaki et al. (6844249 B2) and Background of Invention, taken individually or in combination, do not teach the claimed invention having (Regarding claims 8 and 15) the incident angle  $\theta < \arctan(w/(14xD))$ ,  $(w=(w1+w2)/2)$  and  $\theta < \arctan(w/(2xD))$ ,  $(w=(w1+w2)/2)$ , where w1 indicates a beam width of the laser beam irradiated onto the irradiation target, w2 indicates a beam width of the part of the laser beam at the irradiation target after reflected by a back surface of the substrate, and D indicates the thickness of the substrate.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE  
Primary Examiner  
Art Unit 2818

